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DEVELOPMENT OF ELECTRIC POWER SYSTEMS
 AND TRANSMISSION NETWORKS IN THE SOUTHERN USSR

[This report consists of excerpts from an anonymous article
 by author P., one of several mimeographed and issued by the East
 European Fund, Inc., under the English title "Electrification
 Plans and the Deficiency of Electric Power for Industry in the
 Soviet Union." Author P. writes on the basis of many years of
 experience with the electric power systems of the industrial
 Southwest of the USSR.]

Before 1940, the Donenergo and Azcherenergo electric power systems were
 among the larger systems in the USSR and supplied power to coal, chemical,
 and metallurgical industries in the Dabass and Rostovskaya Oblast, and to
 cement factories near Novorossiysk in Krasnodarskiy Kray. At the time of
 their organization, their main sources of power supply were Shterovskaya,
 Zuyevskaya, Severo-Donetskaya, Shakhtinskaya, and Novorossiyskaya electric
 power stations. Of these, the first three together with 20 other stations,
 which previously had belonged to individual industrial enterprises, formed
 the Donenergo, and the others, together with several smaller TES, formed
 Azcherenergo. The installed capacities of these two systems expressed in
 kilowatts were as follows:

	1 Jan 1931	1 Jan 1935	1 Jan 1940
Donenergo			
Shterovskaya GRES	64,000	152,000	152,000
Zuyevskaya GRES	-	150,000	250,000
Severo-Donetskaya GRES	29,000	65,000	73,000

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	1 Jan 1931	1 Jan 1935	1 Jan 1940
Kurakovskaya GRES			
Former plant and mine TES (1)	130,700	69,600	70,000
Total	223,700	436,600	545,000
Azcherenergo			
Shakhtinskaya GRES	44,000	90,000	90,000
Vlasovskaya GES	11,000	9,000	9,000
Rostovskaya TETs	11,170	6,300	9,000
Nesvetayevskaya GRES			
Kamenskaya TETs			
Total for the northern network	66,170	105,300	108,000
Krasnodarskaya GRES	--	10,000	10,000
Novorossiyskaya GRES No 1	20,000	20,000	20,000
Novorossiyskaya GRES No 2 (2)	--	3,000	3,000
Total for the southern network	20,000	33,000	33,000
Total for entire Azcherenergo	86,000	138,300	141,000

(1) These included Pervomayskaya, Kaliyevskaya, and Uspenskaya power stations in the Almazo-Mar'yevskiy region; Budenovskaya, Rutchenskoyevskaya, Ekaterinovskaya, Grishinskaya, Smol'yaninovskaya, and Sovetskaya in Stalinovskiy and Makeyevskiy regions; Gorlovskaya, Shcherbtinovskaya, Konstantinovskaya, Promyvochnaya, and Yunkom in the Central Region; Krasnodonskaya and Tsolzhanskaya in Krinpychevsko-Chistyakovskiy region. In connection with the opening of the Zuyevskaya GRES, some of these stations were closed; as a result, their total capacity decreased in 1935. Their total capacity on 1 January 1940 is based on an estimate.

(2) Formerly belonged to a cement plant; was included in Azcherenergo in 1932 or 1933.

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Turbogenerators on 1 Jan 1940

Boilers on 1 Jan 1940

Electric Power Stations	Make	No and Capacity (kw)	Make	No	Heating Surface (sq m)	Pres- sure (atm)	Temperature (superheated steam, °C)	Steam Generat- ing Capacity (tons/hr)
Shterovskaya GRES	Metro-Vickers	2 x 10,000	Babcock-Wilcox	6	610	18	375	25
	VVS	2 x 22,000	" "	2	624			
	Siemens-Schuckert	2 x 44,000	Taganrog Boiler Plant	10	1,500			50 - 75
		6 152,000		18				
Zuyevskaya GRES	Metro-Vickers	3 x 50,000	Khonomag	4	1,500			120 - 150
	Khar'kov Turbine Plant	1 x 100,000	Steinmueller	4	1,500			
	Khar'kov Turbine Plant	1 x 100,000		8				
		5 350,000						
Severo-Donetskaya GRES	AEG	1 x 10,000	Walter	5	600	32	420	20 - 25
	AEG	2 x 22,000	Meller	7	842			40 - 42
	AEG	1 x 3,000		12				
	AEG	1 x 8,000						
	Thomson-Hudson	1 x 5,000						
	AEG	1 x 3,000						
		7 73,000						
Shakhtinskaya GRES	VUmag	2 x 22,000	Rota	4	1,000			50
	"	1 x 22,000	Babcock-Wilcox	4				
		1 x 24,000		8				
		4 90,000						
Novorossiyskaya GRES	Leningrad Machine Plant	2 x 10,000	Leningrad Machine Plant	4	750			
		2 x 20,000						
Krasnodonskaya GRES	Leningrad Machine Plant	2 x 5,500	Krupp	3	450			
		2 11,000						

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In 1934, the Donenergo and Azcherenergo were connected by a high-voltage transmission line. In 1940, the third system, the Dneprovskaya system (Dneproenergo), was connected to the consolidated system and it became a complex electric power organism covering a large territory of the Dnepr Region, Donbass, and Rostovskaya Oblast under the name of "Southern Electric Power System." Kamenskaya TETs, which has two turbogenerators of 44,000 kilowatts each (estimate), and Nesvetayevskaya GRES, which has one turbogenerator of 50,000 kilowatts, were added to the Azcherenergo system during World War II. Kurakovskaya GRES, which has a capacity of 25,000 or 50,000 kilowatts, was in operation within the Donenergo in 1941.

After World War II, Azcherenergo became Rostenergo and retained only those power stations which formed the northern network, i.e., Shakhtinskaya, Kamenskaya, and Nesvetayevskaya. Power stations in Krasnodar and Novorossiysk formed an independent system. The Donenergo was renamed Donbassenergo.

Because of the frequent breakdowns at the power stations there always was a great discrepancy between installed and available capacities. The table below gives these discrepancies in 1933 for three main power stations of the Donenergo.

	<u>Installed Capacity</u>			<u>Available Capacity</u>		
	<u>Turb</u>	<u>Gen</u>	<u>Boilers</u>	<u>Turb</u>	<u>Gen</u>	<u>Boilers</u>
Zuyevskaya GRES	150	150	165	135	135	125
Shterovskaya GRES	152	152	154	152	152	115
Severo-Donetskaya TETs	73	73	62	29	29	22
Total	375	375	381	316	316	262

Transmission Lines

Up to 1930, the Donenergo system had only one 115,000-volt transmission line, 56 kilometers long, between Shterovka and Kadiyevka. With an increase of the system's capacity, the following 115,000-volt lines were built: Shterovka-Roven'ki, Zuyevka-Yenakiyevo-Gorlovka, Zuyev-Rykovo, and from Zuyevskaya GRES to Amvrosiyevskaya substation in the south to the Azcherenergo system. In 1940, an 81-kilometer-long 220,000-volt line was built between the Zuyevskaya and Kurakovskaya power stations.

The Azcherenergo's first high-voltage line, which was 110,000 volts, was built in 1929, between Shakhtinskaya GRES and the city of Rostov-on-Don. Later the line was extended to Taganrog and finally connected to the Donenergo System at the latter's Amvrosiyevskaya substation. Another line of 110,000 volts extended north from Shakhtinskaya GRES to Kamenskaya TETs at Kamensk on the Donets River, via Krasnyy Sulin. The following lines of the same voltage were built in 1942: Nesvetayevskaya GRES -- Rostov-on-Don, and a second line between the Azcherenergo and Donenergo systems from Kamenskaya TETs toward Shterovskaya GRES.

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